

WHAT IS CLAIMED IS:

- Sub 3* 1. A process for heating semiconductor substrates comprising the steps of:
- 5 placing a semiconductor substrate in a processing chamber;
- directing light energy onto said semiconductor substrate for heating said semiconductor substrate, said light energy contacting said semiconductor substrate at an angle of incidence of
- 10 greater than 0° ; and
- wherein said light energy contacts said semiconductor substrate in a p-polarized plane or near said p-polarized plane.
2. A process as defined in claim 1, wherein said light energy
- 15 is emitted by an incoherent light source.
3. A process as defined in claim 1, wherein said light energy contacts said semiconductor substrate at an angle of incidence of greater than 10° .
4. A process as defined in claim 1, wherein said light
- 20 energy is polarized creating a first p-polarized light energy beam and a second p-polarized light energy beam, said first and second p-polarized light energy beams being directed onto said semiconductor substrate.
5. A process as defined in claim 1, further comprising the step of collimating the light energy prior to polarizing said light energy.
- 25 6. A process as defined in claim 5, wherein said light energy is collimated using a reflective device.
7. A process as defined in claim 5, wherein said light energy is collimated using an optical lens.

8. A process as defined in claim 1, wherein said light energy is polarized using a wire-grid polarizing device.

9. A process as defined in claim 1, wherein said semiconductor substrate is heated by said light energy in combination with other energy sources.

10. A process as defined in claim 9, wherein said other energy sources comprise light energy sources.

11. A process as defined in claim 1, wherein said light energy is emitted by an arc lamp or a tungsten halogen lamp.

12. A process as defined in claim 1, wherein said light energy contacts said semiconductor substrate at an angle of incidence of from about 40° to about 85°.

13. A process as defined in claim 1, further comprising the step of sensing the amount of said light energy that is reflected off said semiconductor substrate and, based upon this information, changing the configuration of said light energy in order to change the amount of light energy absorbed by said semiconductor substrate.

14. A process as defined in claim 1, wherein said semiconductor substrate is heated by said light energy in combination with an electrical resistance heater.

15. A process as defined in claim 1, further comprises a step of redirecting any portion of said light energy that is reflected off said semiconductor substrate onto said semiconductor substrate.

16. A process for heating semiconductor substrates comprising the steps of:

placing a semiconductor substrate in a processing chamber; and

directing laser beams onto said semiconductor substrate from at least a first laser and a second laser, wherein said first

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are in a p-polarized state.

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incidence of from about 40° to about 85° .

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said laser beams are pulsed laser beams.

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25. A process as defined in claim 16, further comprising the step of redirecting any portion of said laser beams that are reflected off said semiconductor substrate back onto said semiconductor substrate.

26. A process as defined in claim 16, further comprising the step of sensing the amount of light energy from one of the lasers that is reflected off the semiconductor substrate and, based on this information, changing the configuration of at least one of the lasers in order change the amount of light energy absorbed by the semiconductor substrate.

27. A process for heating semiconductor substrates comprising the steps of:

placing a semiconductor substrate in a processing chamber;

directing a pulsed laser beam onto said semiconductor substrate;

configuring said pulsed laser beam to strike said substrate at an angle of incidence of at least 10° ; and

configuring said pulsed laser beam to strike said substrate so that said pulsed laser beam strikes said substrate in a p-polarization plane.

28. A process as defined in claim 27, wherein said pulsed laser beam strikes said semiconductor substrate in order to carry out an ion implantation anneal process.

29. A process as defined in claim 27, wherein said pulsed laser beam strikes said substrate at an angle of incidence of from about 40° to about 85° .

30. A process as defined in claim 27, wherein, in addition to said pulsed laser beam, said semiconductor substrate is heated by other energy sources.

31. A process as defined in claim 27, wherein said

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semiconductor substrate is contacted by at least one other laser beam in addition to said pulsed laser beam, said other laser beam contacting said semiconductor substrate at an angle of incidence that is different than the angle of incidence at which pulsed laser beam contacts said semiconductor substrate.

32. A process as defined in claim 31, wherein said other laser beam is a also a pulsed laser beam.

33. A process as defined in claim 27, wherein said semiconductor substrate is contacted by at least one other laser beam in addition to said pulsed laser beam, said other laser beam having a wavelength range that is different than the wavelength range of said pulsed laser beam.

34. A process as defined in claim 27, further comprising the step of redirecting any portion of said pulsed laser beam that is reflected off said semiconductor substrate onto said semiconductor substrate.

35. A process as defined in claim 27, wherein besides said laser beam, said semiconductor substrate is heated by an electrical resistance heater.

36. A process as defined in claim 27, further comprising the step of sensing the amount of the pulsed laser beam that is reflected off of the semiconductor substrate and, based upon this information, changing the configuration of the pulsed laser beam in order to change the amount of light energy absorbed by the semiconductor substrate.

37. A process for heating semiconductor substrates comprising the steps of:

placing a semiconductor substrate in a processing chamber; and

directing at least a first laser beam and a second laser beam onto said semiconductor substrate for heating said substrate,

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45. A process as defined in claim 37, further comprising the step of sensing the amount of said laser beams that is reflected off of said semiconductor substrate, and based on this information, changing the configuration of at least one laser in order to change the amount of light energy absorbed by said semiconductor substrate.

46. A process as defined in claim 37, further comprising the step of sensing the amount of light energy from one of the lasers that is reflected off the semiconductor substrate and, based on this information, changing the configuration of at least one of the lasers in order change the amount of light energy absorbed by the semiconductor substrate.

47. A process for heating semiconductor substrates comprising the steps of:

placing a semiconductor substrate in a processing chamber, said substrate being at least substantially surrounded by a slip free ring; and

directing light energy onto said slip free ring for heating said semiconductor substrate, said light energy contacting said slip free ring at an angle of incidence greater than 0° , said light energy also contacting said slip free ring in a p-polarized state, an elliptically polarized state, or near a p-polarized state.

48. A process as defined in claim 47, wherein said semiconductor substrate is also heated by an electrical resistance heater.

49. A process as defined in claim 47, wherein said slip free ring is heated by at least one laser.

50. A process as defined in claim 47, wherein said light energy is also directed onto and heats said semiconductor substrate.

51. A process as defined in claim 47, wherein said slip free ring is coated with an anti-reflective coating.

52. A process for heating semiconductor substrates comprising the steps of:

placing a semiconductor substrate in a processing chamber;

rotating said semiconductor substrate in said

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processing chamber;

directing light energy onto said semiconductor substrate for heating said semiconductor substrate, said light energy contacting said semiconductor substrate at an angle of incidence of greater than 0° , said light energy also contacting said semiconductor substrate in a p-polarized state, an elliptically polarized state, or near a p-polarized state, said light energy contacting said semiconductor substrate at a location on a radius of said substrate and wherein said entire radius of said substrate is heated through the rotation of the wafer.

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